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14th Annual ALS Users' Association Meeting

Sponsored by the Users' Executive Committee (UEC) and spread over three days from October 15–17, 2001, the 14th annual ALS Users' Association Meeting featured an exceptional program with science as the main theme. While the first day was reserved for the traditional facility and Washington reports and for science highlights, the following two days, devoted to several workshops covering topics from theory to detectors, new experimental facilities, and forefront science, were strong draws. As a result, it should not be surprising that the number of registered attendees jumped to a record level of 352, more than 100 above the typical attendance in recent years. The successful commissioning of the long-awaited superconducting bend magnets, or superbends, in the ALS storage-ring lattice just before the meeting opened (see news item on pg. XXXXX) also helped stimulate interest.

After a brief introduction by Roger Falcone (University of California, Berkeley), the incoming UEC chair for 2002, Berkeley Lab Director Charles Shank began the Monday morning update session by looking forward to the considerable scientific impact expected for the new superbend era with an expanded ALS spectral range that now extends well into the hard X-ray region. Patricia Dehmer, DOE Associate Director for Basic Energy Sciences (BES), pointedly noted that ALS funding was up in an era of flat BES budgets. Noting the growing importance of nanoscience, Dehmer also called attention to the adaptations required if an institution is to thrive in a changing world with the rise of advanced tools as the driving force for new science, shifting roles for government and other laboratories, and the recent emphasis on life science in U.S. federal funding for science.

Among many topics in his detailed facility report, ALS Director Daniel Chemla highlighted the proposed new Berkeley Lab nanoscience center (the Molecular Foundry), in which the ALS will play a key role. The Molecular Foundry, expected to be complete in about four years, will house facilities under one roof for the iterative research cycle for new materials (design, synthesis, measurement and analysis). David Robin, ALS Accelerator Physics Group Leader, reported on the many challenges met and overcome in installing and commissioning the superbends ahead of a tight schedule while meeting or exceeding performance specifications.

Outgoing UEC Chair Harald Ade (North Carolina State University) conducted a user town meeting in which he explained the many ways in which the UEC contributes to ALS planning, introduced the new electronic voting system, and summarized interactions with Congress in collaboration with the UECs of other synchrotron sources. Michael Lubell (City College of New York) concluded the update session with a review of the changes in Washington brought out by the soft economy and the new war on terrorism, contributing to which is becoming the top priority for federally funded science.

Commencing a session on scientific highlights at the ALS, Yves Petroff (serving as Senior Advisor while on sabbatical at the ALS) presented preliminary results of his investigation of ALS operations and scientific productivity, calling favorable attention to the storage ring performance, the rise of structural biology research, high-resolution photoemission spectroscopy, atomic and molecular science, opportunities for inelastic scattering, exploitation of coherent light, femtosecond time-resolved science, and high-pressure research. Recommendations included increasing support for users, lowering the cost of experimental facilities, use of standardization and automation, continuing past successes with industrial beamlines, prioritizing which research areas to emphasize,

Figure 1: Morning speakers included (from left) Pat Dehmer (U.S. DOE Office of Basic Energy Sciences) and Yves Petroff, Daniel Chemla and David Robin (all ALS).

making time for in-house research by ALS staff, and more cooperation with the Stanford Synchrotron Radiation Laboratory (SSRL).

Patrick Naulleau (Berkeley Lab) continued the scientific highlights with a presentation on "Recent Developments in EUV lithography at the ALS: At-wavelength interferometric and print-based characterization of the EUV engineering test stand set-2 optic." In his talk, he recounted contributions at the ALS to a huge program funded by the microelectronics industry and carried out at Sandia National Laboratories, the Lawrence Livermore National Laboratory, and Berkley Lab aimed at developing next-generation lithography tools. Richard Saykally (University of California, Berkeley) concluded the morning's activities with a survey of work by his group on "Liquid water spectroscopy." The use of water jets provided a way to carry out X-ray spectroscopy of liquid surfaces otherwise hindered by the volatility of the liquid.

After a leisurely break for lunch on the ALS patio and visits to vendor exhibits, the scientific presentations shifted to highlights from young researchers. Steven Johnson (University of California, Berkeley) described use of a streak camera with 5-ps resolution in experiments on "Laser-induced melting of silicon observed by ultrafast time-resolved X-ray absorption spectroscopy." Daniel Rolles (Fritz-Haber-Institut, Berlin) followed with a discussion of how to combine photofragmentation with coincident detection of electrons and ions to obtain "Photoelectron angular distributions from fixed-in-space molecules."

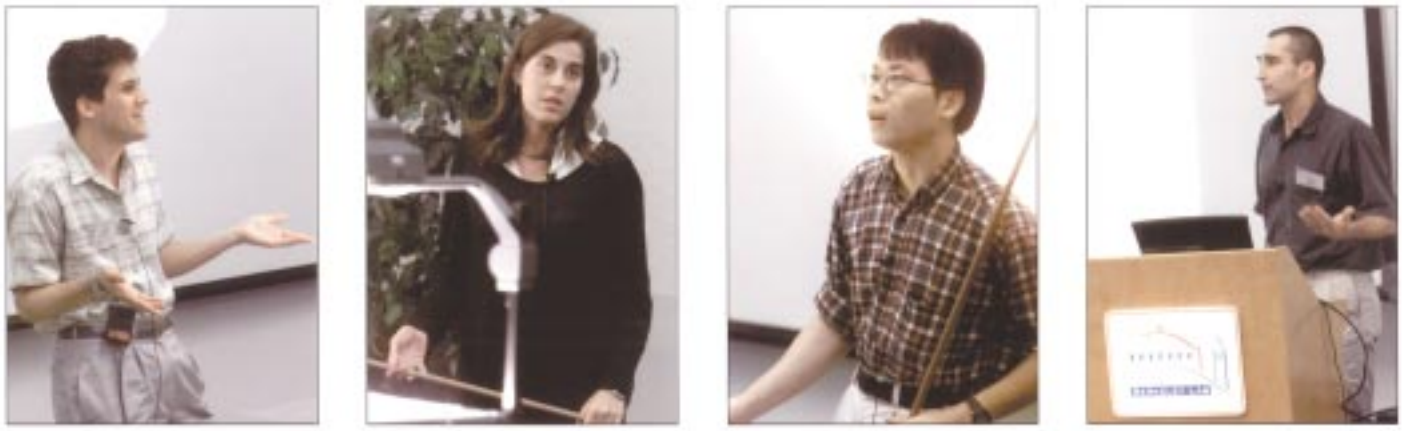

Figure 2: The Highlights from Young Researchers and Science Highlights sessions featured presentations by (from left) Steven Johnson (University of California, Berkeley), Alessandra Lanzara (Stanford University and ALS), Yi-De Chuang (University of Colorado, Boulder) and Tobias Funk (Berkeley Lab).

Figure 3: Meeting participants braved the cool weather to view vendor exhibits, enjoy the buffet dinner on the ALS patio, and attend the poster session.

Tobias Funk (Berkeley Lab) then emphasized the need for high magnetic fields and low temperatures in a review of experiments with circularly polarized synchrotron radiation in his talk "XMCD on metalloproteins and model compounds using the EPU of the ALS." Hendrik Ohldag (SSRL, ALS and Universität Düsseldorf) applied photoemission electron microscopy (PEEM) to the problem of exchange bias in magnetic multilayers in a presentation on "Interface magnetic structure of Co/NiO." Alessandra Lanzara (Stanford University, SSRL, and ALS) ended the session by reviewing the recent evidence for the role of lattice vibrations in high-temperature superconductivity in her discussion of "Angle-resolved photoemission spectroscopy of high-temperature superconductors."

The final session of scientific highlights began with a review of "Recent achievements in X-ray microscopy for materials and life sciences," in which Gerd Schneider (Berkeley Lab) described applications of the transmission X-ray microscope to magnetic materials in magnetic fields, nondestructive imaging of electromigration in integrated circuit interconnects, and nanotomography of biological cells. K. Christopher Garcia (Stanford University) continued with an overview of "New structural paradigms in receptor recognition and activation," in which he describe the 2.4-Å crystal structure of viral interleukin-6 in complex with an extracellular fragment of human gp130, a shared signal-transducing receptor for a family of cytokines.

Steven Kevan (University of Oregon) next discussed "Coherent soft X-ray magnetic scattering" as applied to cobalt-platinum multilayers (SRN, Vol. 14, Issue 2, 2001, pp. 11–19), the first phase of a new program aimed at obtaining high spectral and spatial resolution while probing static and dynamic magnetic phenomena at nanometer length scales. Yi-De Chuang finished up the formal portion of the day's activities by returning to the subject of investigating high-temperature superconductivity with angle-resolved photoemission in a presentation on "Observation of non-vanishing interlayer coupling in bilayer cuprates: Bi2212." The day ended with a vendor's exhibit and refreshments on the ALS patio.

Workshops took over on Tuesday and Wednesday. Topics and organizers of the seven workshops were Advanced Detectors for Synchrotron Experiments (Al Thompson, ALS), Future Directions in Soft X-ray Molecular Environmental Science (David Shuh, Berkeley Lab), Infrared Spectromicroscopy and Future Infrared Sources (Michael Martin and Wayne McKinney, Berkeley Lab), Macromolecular Crystallography Frontiers: More Structures with Less Beamtime (Gerry McDermott,

Berkeley Lab), Spectroscopies of Electronic Materials: Correlated Electrons and Nanoscale Phenomena (Dan Dessau, University of Colorado; Zahid Hussain, ALS; and Z.Q. Qiu, University of California, Berkeley), SRRTNet Workshop on Theory, Computation, and Synchrotron Experiments (Michel Van Hove, Berkeley Lab), and CALIPSO: A New High-Pressure Science Initiative at UCB and the ALS (Simon Clark and Howard Padmore, ALS). Separate reports from some of these workshops follow this article.

Late Tuesday afternoon and evening featured poster presentations, vendor booth visits, a reception and dinner, and an awards ceremony. In a notable departure from past practice, the organizers replaced the usual conference banquet with an outdoor buffet on the ALS patio and with the aid of generous instrument vendors provided enough food and beverages that few noticed the chilly fog. At the end of the buffet, Ade, assisted by Dennis Lindle (University of Nevada, Las Vegas) and Rupert Perera (Berkeley Lab Center for X-ray Optics), who co-chaired the meeting program committee, presented awards for science and service.

Gary Mitchell and Ed Rightor (Dow Chemical Company) received the David A. Shirley Award for Science at the ALS for their research using scanning X-ray microscopy to point the way to improved super absorbent polymers, a material used in disposable baby diapers, among other products. David Robin, representing the entire team of scientists, engineers and technicians who constituted the superbend team accepted the Halbach Award for Outstanding Instrumentation. Hendrik Olhdag (SSRL and ALS) and Christoph Bostedt (Lawrence Livermore National Laboratory and ALS) split the student poster award for their presentations titled "Interface Magnetic Structure of Co/NiO" and "Surface Passivation Effects of Deposited Germanium Nanocrystal Films Probed with Synchrotron Radiation," respectively. The Tim Renner User Services Award was also divided, with Elke Arenholz (ALS Scientific Support Group) and Ken Barat (Berkeley Lab laser safety officer) the two winners. Greg Vierra (ALS Technical Information Section) was also recognized for creating the design used on the T-shirt and the meeting booklet. ■

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